REMARKS

Summary of Office Action

Claims 1-8, 12, and 13 were pending in this application.

Claims 1, 3, and 12 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

Claims 1, 4, and 10 were rejected under 35 U.S.C. § 103(a) as being obvious from Takai et al. U.S. Patent No. 4,963,441 ("Takai") in view of Yocom et al. U.S. Patent No. 6,071,432 ("Yocom").

Claims 2 and 3 were rejected under 35 U.S.C. § 103(a) as being obvious from Takai in view of Hase et al. U.S. Patent No. 5,839,718 ("Hase"). Claim 5 was rejected under 35 U.S.C. § 103(a) as being obvious from Takai in view of Murazaki et al. U.S. Patent No. 6,617,781 ("Murazaki"). Claims 6 and 7 were rejected under 35 U.S.C. § 103(a) as being obvious from Takai in view of Murayama et al. U.S. Patent No. 5,424,006 ("Murayama"). Claim 8 was rejected under 35 U.S.C. § 103(a) as being obvious from Takai in view of Kanenari et al. U.S. Patent No. 6,431,236 ("Kanerari") and Murayama.

Claims 1, 12, and 13 were rejected under 35 U.S.C. § 103(a) as being obvious from Masahiro et al. JP 2004-010409 ("Masahiro"). Claims 2-5 and 8 were rejected under 35 U.S.C. § 103(a) as being obvious from Masahiro in view of Hase, Kanerari, Murazaki, and Yocom. Claims 6 and 7 were rejected under 35 U.S.C. § 103(a) as being obvious from Masahiro in view of Murayama.

Summary of Applicants' Reply

Applicants have amended claims 1, 3, 10, and 12 and have added new claim 16 to more particularly define the invention. No new matter has been added and the amendments are fully supported by the originally filed specification (see, e.g., applicants' specification at p. 3, ll. 17-18, p. 9, l. 2, and p. 11, Example 2).

The Examiner's rejections are respectfully traversed.

Reply to the Section 112 Rejection

Claims 1, 3, and 12 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicants respectfully traverse this rejection.

More particularly, with regards to claim 1 the Examiner stated, "it is unclear what ... the compositions encompassed by the phrase 'common silicate glass' [are]." Applicants' claim 1, as amended, includes a matrix glass that is sodium-calcium-silicon glass.

With regards to claims 3 and 12 the Examiner stated that the limitations have insufficient antecedent basis. Applicants have amended claims 3 and 12 to provide antecedent basis for the claimed limitations.

Accordingly, applicants respectfully submit that claims 1, 3, and 12, are in compliance with 35 U.S.C. § 112 and respectfully request this rejection be withdrawn.

Reply to the Rejections Under
35 U.S.C § 103(a)

Applicants' amended claim 1 is directed to a light-storage self-luminescent glass that includes (a) 0.01-40% by weight of a light-storage self-luminescent material activated by multiple ions and (b) 99.99-60% by weight of a matrix glass. The light-storage self-luminescent material has a particle size ranging from 0.8 mm to 20 mm.

The Examiner rejected claims 1-8 and 10 under 35 U.S.C. § 103(a) as being obvious from Takai in view of Hase, Murazaki, Murayama, or Kanerari. Applicants respectfully traverse this rejection.

Takai describes a method for producing a light-storing fluorescent ceramic article. A glaze of fluorescent material with about 5-500μm particle size is applied to a ceramic article and the coated ceramic body is baked to produce the light-storing fluorescent ceramic article (Takai, col. 2, ll. 20-25 and col. 4, ll. 3-16).

Applicants respectfully submit that Takai does not show or suggest, among other things, a light-storage self-luminescent glass including 0.01-40% by weight of a light-storage self-luminescent material, with a particle size from 0.8mm to 20mm, and a matrix glass. To the contrary, Takai describes a fluorescent glaze that is applied to a ceramic article. Clearly, a ceramic article having a fluorescent glaze is different from applicants' self-luminescent glass. Additionally, As described in column 3, lines 27-32 of Takai, if the frit (i.e., light-storage material) is above 15 parts by weight, a glass may form, react with the sulphide, and decompose the fluorescent material, thereby causing it to fail to give afterglow-sustaining ability to the coating that is

applied to the ceramic article. Clearly, Takai does not show or suggest a glass having 0.01-40% by weight of a light-storage self-luminescent material. The Examiner relies on Hase, Murazaki, Murayama, and Kanerari as allegedly showing other limitations of applicants' claims 1-8 and 10. Applicants' respectfully submit that none of the secondary references make up for the deficiencies of Takai in that regard.

Therefore, because Takai and Hase, Murazaki, Murayama, or Kanerari, whether taken alone or in combination, do not show or suggest a light-storage self-luminescent glass including 0.01-40% by weight of a light-storage self-luminescent material, with a particle size from 0.8mm to 20mm, and a matrix glass, applicants' independent claim 1 and claims 2-8 and 10, which depend directly or indirectly therefrom, are patentable.

The Examiner rejected claims 1-8 under 35 U.S.C. § 103(a) as being obvious from Masahiro in view of Hase or Murayama. Applicants respectfully traverse this rejection.

Masahiro describes a process for producing a glass article which consists of molten glass and a powdery luminous stone. The size of the powdery luminous stone ranges from 0.1-1.0 mesh (Masahiro, Abstract and paragraphs 7, 12, and 14).

The Examiner contends that the range of 0.1-1 mesh is equivalent to 0.1-1 inch, or 2.54-25.4 millimeters (Office Action, p. 6). Applicants respectfully disagree.

Section 1.4.5 of "Classification Technique of Ultra-fine Pulverization" (attached as Appendix A) provides a description of the present series of ISO

standard screens, expressed in mesh. Mesh is understood in the art to "mean the number of screen pores on each inch in the length of the screen." Therefore, the stone (i.e., particle) described in Masahiro having a size of 0.1-1 mesh is in fact as large as 10 inches (254 millimeters) and as small as 1 inch (25.4 millimeters). Furthermore, in Masahiro the particle size must be kept in the range of 0.1-1.0 mesh otherwise, if the particle is larger than 0.1 mesh cracking during manufacturing will result and if the particle is smaller than 1.0 mesh the article becomes weak and less desirable (Masahiro, paragraphs 7 and 14). Thus, applicants' respectfully submit that Masahiro does not show or suggest a light-storage self-luminescent glass particle with a particle size from 0.8mm to 20mm, as defined by applicants' claim 1. None of the secondary references, Hase, Kanerari, Murazaki, Yocom, nor Murayama, cited by the Examiner as showing additional limitations of the claims, make up for the deficiencies of Masahiro in that regard.

Accordingly, because Masahiro and Hase, Kanerari, Murazaki, Yocom, or Murayama, whether taken alone or in combination, do not show or suggest a light-storage self-luminescent glass including a light-storage self-luminescent material with a particle size from 0.8mm to 20mm, applicants' independent claim 1 and claims 2-8, which depend directly or indirectly therefrom, are patentable.

Applicants' claimed invention, as defined by amended claim 12, is directed to a process for producing a light-storage self luminescent glass, where the glass includes 0.01% to 40% by weight of a light-storage self-luminescent material having a particle size of 0.8-20 millimeters. The matrix glass is heated and

melted. Then, the light-storage self-luminescent material is doped into the melted glass to produce a mixture and mixture is formed at 900-1300°C.

The Examiner rejected claims 12 and 13 under 35 U.S.C. § 103(a) as being obvious from Masahiro. Applicants respectfully traverse this rejection.

Applicants respectfully submit that Masahiro does not show or suggest, among other things, doping a light-storage self-luminescent material into melted glass to produce a mixture and forming the mixture at 900-1300°C. Instead, as described in paragraphs 6 and 12 of Masahiro, the glass is melted over a burner and the powdery light-storage stone is applied equally around the outside of the heated glass. If the light-storage stone penetrates the surface of the heated glass, the "glass-blowing mold ... do[es] not shine with sufficient balance over the whole." Clearly, Masahiro does not show or suggest melting the glass and doping a light-storage material into the melted glass to produce a mixture.

Accordingly, because Masahiro does not show or suggest a process for producing a light-storage self-luminescent glass including melting glass and doping a light-storage self-luminescent material into the melted glass to produce a mixture, applicants' claims 12 and 13, which depend directly or indirectly from patentable claim 1, are patentable.

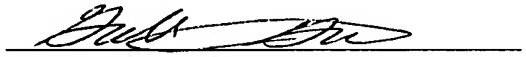
New Claim 16

Applicants have added new claim 16 to more particularly define the invention. Claim 16 depends from claim 1, and therefore is patentable for at least the reasons claim 1 is patentable.

Conclusion

For the reasons set forth above, applicants respectfully submit that this application, as amended, is in condition for allowance. Reconsideration and allowance of this application are respectfully requested.

Respectfully submitted,



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前 言

随着我国科学与工业技术的进步，粉体工程作为一门科学越来越显得重要。特别是超细粉碎分级技术作为粉体加工制备过程的重要手段，在材料、非金属矿、化工、冶金、食品、医药、饲料等行业得到了广泛的应用，为了普及这一技术，加快粉体工程技术的发展，此书作者们将自己多年研究成果和工业应用经验整理成书，并力求使全书有系统性和可读性。由于粉碎技术涉及到的行业较多、内容复杂，设备、工艺、产品间的关系交错、复杂，作为特定产品的单元作业进行更详细的介绍是比较困难的，因此书中一定会有讨论得不够的地方，殷切希望读者批评指正。

此书是以从事粉体加工的工程技术人员为主要读者群，也可兼作研究生专业教材。针对粉碎与分级中常出现的问题，书中系统阐述了超细粉碎与分级的基本原理、数学模型、计算机模拟、系统优化、粉体表面改性等，对粉碎与分级设备、原理、工艺设计等工程上实际问题和相关知识做了介绍，同时还列举了大量的工业应用实例，以便工程设计人员参考。

本书由盖国胜主编、并撰写了第一章的第一节、第二节，第二章，第八章，第九章。马正先做全书的统稿和主审，并撰写了第三章，陶珍东撰写了第一章的第三节、第四节，第六章，徐政侃写了第五章，胡小芳撰写了第七章，彭绕撰写了第四章。

此书在编写过程中参阅了大量的文献，在此向编写这些文献的作者们表示衷心的感谢。

作 者

1999年春于清华园

1.4.5 筛目与粒径的关系

工业生产中，一般细度粉体的粒度分析常用较为简单的筛分方法。为了能够进行多级粒度的筛分测定，目前已有国际标准化组织（ISO）系列标准筛。该系列筛的规格用"目"表示。所谓目数即是每一英寸筛网长度上所具有的筛孔个数。筛目数与颗粒粒径的关系见表 1-12。

表 1-12　　筛目与粒径的关系

(筛目/孔宽) /μm	DIN4188/mm	ASTM E-11-70, NO	TYLER/筛目	BS410/筛目
5	0.005		2500	2500
10	0.010		1250	1250
15	0.015		800	800
20	0.020		625	625
22	0.022			
25	0.025		500	500
28	0.028			
32	0.032		425	425
36	0.036			
38		400	400	400
40	0.040			
45	0.045	325	325	350
50	0.050			
53		270	270	300
56	0.056			
63	0.063	230	250	240

续表

(筛目/孔宽) /μm	DIN4188/mm	ASTM E-11-70, NO	TYLER/筛目	BS410/筛目
71	0.071			
75		200	200	200
80	0.080			
90	0.090	170	170	170
100	0.100			
106		140	150	150
112	0.112			
125	0.125	120	115	120
140	0.140			
150		100	100	100
160	0.160			
180	0.180	80	80	85
200	0.200			
212		70	65	72
224	0.224	65	62	66
250	0.250	60	60	60
280	0.280			
300		50	48	52
315	0.315			
355	0.335	45	42	44
400	0.400			
425		40	35	36
450	0.450			
500	0.500	35	32	30
560	0.560			
600		30	28	25
630	0.630			
710	0.710	25	24	22
800	0.800			
850		20	20	18
900	0.900			

English translation of the relevant portion of Appendix A (marked with *)

1.4.5 Relationship between screen mesh and particle size

In industrial production, a simple screening method is generally used in the particle size analysis of finely-grinded powder. In order to carry out screening determination of multiple granularity, a series of ISO(International Organization for Standardization) standard screens have been developed at present. The specification of the screen of this series is expressed in *mesh*. Mesh is understood to mean the number of screen pores on each inch in the length of the screen. The relationship between the number of screen mesh and particle size is shown in Table 1-12.